SID: 1155158247

Q1

   1. B

   2. B

   3. A

   4. A

   5. C

   6. B

   7. C

   8. B

   9. D

   10. A

1 : 7
2 : 47
3 : 247

Q2

   1. Tag : $32 - 5 - 10 = 17$ bits

   2. $(17 + 8 \times 4 \times 8 + 1) \times 2^{10} = 280576$ bits

   3. Tag : $32 - 5 - 9 = 18$ bits

Q3

   1. 247×247

   Shifts : 9

   2. 5 bits

   3. Add nop.

Q4

1. T, T, F, T

2. . . MemtoReg should be set to 1.
   - Effect of setting: It will affect the register transfer
   - Effect if MemtoReg set to other way:
     It will not write back to register file.

Q5.

1. A: $3 + 70 \times (1 - 98.6\%) = 3.98$ ns

   B: $3.3 + 70 \times (1 - 99\%) = 4$ ns

2. CPU_A Time $= 2.0 \times 1000 \times 1.4 \times 3 = 8400$

   CPU_B Time $= 2.0 \times 1000 \times 1.4 \times 3.3 = 9240$

   ∴ A is faster.

Q6.

1. 2nd instruction depend on 1st instruction: RAW

   4th instruction depend on 2nd instruction: WAW
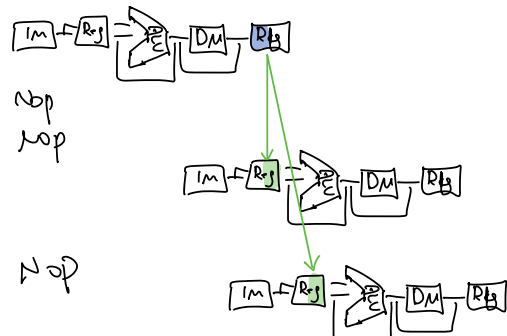
2. addi x11, x12, 6
   add   x13, x11, x12
   subi x12, x14, 5
   lw   x15, 4(x13)

3.

   Nop
   Nop

   Nop

Q7

1 a) hit : 0

b) miss : 3

c) AMAT : 0

2. a) Hit : 0

b) Miss : 3

c) AMAT : 0

Q8

1. Virtual pages : $\dfrac{2^{16}}{2^{8}} = 2^{8}$

2. Maximum size : $2^{16-7} \times 2^{8} = 2^{17}$ bytes

3. Smallest no. of PTEs = $\dfrac{300}{16} \approx 19$

Q9

1. | Tag | Index | offset |

32 - 5 - 10

= 17 bits

Index: 10 bits

offset: 5 bits

$\dfrac{16 KiB}{32} = \dfrac{4096 \text{ words}}{4 \text{ words}}$

$= 1.24 \text{ blocks}$

$= 2^{10}$

2.

}.